



## UNIVERSITY OF WASHINGTON

### SCHOOL OF MARINE AFFAIRS

April 4, 2010

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Room 6811  
14<sup>th</sup> Street & Constitution Avenue, NW  
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The Honorable Jane Lubchenco:

On behalf of the NOAA Science Advisory Board (SAB), I would like to transmit for your consideration the report on the Oceans and Health Working Group (OHWG). At our March 2010 meeting the SAB approved the OHWG Report as advice to NOAA on implementation of its critical engagements in human health and organism health -- both within NOAA and among its many Partners. NOAA has a clear leadership role based on its unique qualifications to monitor certain aspects of the marine environment and to provide forecasts of conditions that potentially affect human and organism health.

The OHWG met three times under the leadership of Chair, Steve Weisberg, and engaged in multiple teleconferences. It developed a set of findings and recommendations which the NOAA SAB commends to your attention as outlined below.

The ocean<sup>1</sup> provides many health benefits, from low fat, high protein food sources and therapeutic drugs to regulation of global temperature. The ocean also poses many hazards, such as hurricanes, pathogens, animal attacks, toxins and contaminants that can cause loss of life or impair health. The potential impact of these threats is enhanced because more than half of the US population lives along the coast. Even those living inland are not immune to the ocean's effects, as ocean-driven climate patterns have been linked to inland outbreaks of several pathogens. These and other threats are likely to increase with predicted changes in climate.

NOAA has multiple programs intended to promote health, but has struggled to define its role in relation to the many other agencies that also have health-related responsibilities. To help NOAA more clearly define its role and actions needed to fulfill that role, the NOAA Science Advisory Board (SAB) established an Oceans and Health Working Group (OHWG) that includes experts in the fields of epidemiology, toxicology, public health, environmental modeling, veterinary science, marine biotechnology, economics, and ocean sciences. The OHWG was charged with identifying opportunities to enhance NOAA's ongoing health-related efforts, including all relationships between the ocean and the physiological well-being of organisms. This report from

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<sup>1</sup> In this report, "ocean" is defined as the open ocean, U.S. coastal waters and the Great Lakes.

the NOAA Science Advisory Board presents the Working Group's findings and recommendations.

### **Finding 1: There is an urgent need for action**

Changes in ocean acidity, temperature, and salinity are affecting the balance of risks and benefits from the sea:

- The geographic range of pathogens is changing associated with changes in ocean temperature
- Harmful algal blooms are increasing in frequency and intensity
- The increased intensity of tropical storms has placed coastal regions at increased risk of catastrophic flooding
- Decreased availability of domestic seafood has led to increased importation from countries with lower public health and food handling standards
- The frequency of epidemics and number of new diseases in corals, sea turtles, and marine mammals has increased, with many linked to climate change effects

Given the close linkage between human and animal health, the negative impact of oceanic changes on aquatic organisms offers early warning about the potential for human health risks. This linkage is the foundation for the One Health Initiative, a movement to create collaborations among multiple health-related disciplines, including physicians and veterinarians. The One Health Initiative recognizes the interdependencies among human, wildlife and ecosystem health and recognizes that efforts to protect human, animal, and ecosystem health should be coordinated to benefit all.

In contrast to health threats, the ocean also provides great promise for health benefits through high quality food sources and development of new pharmaceuticals. Marine habitats offer underexplored opportunities for discovery of novel chemicals with therapeutic potential. Scientists have already isolated more than 20,000 biochemical compounds from sea creatures, leading to several new classes of drugs for treating an array of diseases.

### **Finding 2: NOAA is well positioned to meet this need**

NOAA is the nation's leader in oceanographic, meteorological, and atmospheric predictive science. More importantly, NOAA is leading development of early warning systems to identify and forecast ocean conditions that can threaten human, marine organism, and marine ecosystem health. NOAA has incorporated these predictive capabilities into identifying how climate change may affect the extent and diversity of ocean-related public health impacts. NOAA also leads the nation's efforts to monitor and preserve marine mammal health, which is closely linked to and serves as an important sentinel for human health. In addition to these technical skills, NOAA has legislative mandates to implement and coordinate ocean-related health activities. NOAA has the partnering skills to unify the activities of the many other agencies with programs that address ocean health threats and opportunities. NOAA is uniquely positioned to manage these diverse resources to protect those who use, eat, or otherwise enjoy the ocean's bounty.

**Finding 3: NOAA has a diverse health portfolio in place, but the pieces need to be linked together to form a more comprehensive, coordinated program**

NOAA already possesses many excellent programmatic elements that promote health and well-being, but they are scattered across many parts of the agency and lack a unifying structure. The programs also appear to result from the interests and skills of the individual research centers, rather than from a cohesive planning effort. During this review, NOAA was asked to list all of its activities intended to increase understanding of, and prevent health risks from, ocean-related hazards. The list largely reflected a focus on biological research programs centered on the Oceans and Human Health Initiative and did not equally represent operational or research programs focused on protecting health from physical oceanographic hazards. Social science assessments of risk perception, management and response similarly were absent. There appears to be no entity within NOAA responsible for linking these pieces into a coordinated program to promote and protect public health.

**Finding 4: NOAA needs to better quantify and communicate the benefits of its investment in health-related activities**

NOAA's activities save lives and enhance health, but the agency doesn't effectively quantify and communicate its successes and their societal impact. NOAA has developed hazard screening systems for fish and shellfish contamination, coastal flood warning systems, and predictive models for search and rescue, among many other products that benefit the public, but these contributions have not drawn an appropriate level of public recognition and support. The agency needs to develop metrics that quantify its relevance to public well-being, including the number of lives saved and illnesses prevented, as well as economic gains upheld or losses prevented. NOAA should quantify its achievements and proactively leverage this information to increase public awareness about the important societal benefits of its health programs.

Based on these findings, the OHWG advances three core recommendations:

**Recommendation 1: NOAA should establish health protection, preservation and enhancement as an agency-wide goal**

NOAA should acknowledge that identification and protection of ocean-health linkages are critical to the agency's core mission and commit at the highest administrative level to a national leadership role appropriate to the agency's unique skill sets and capabilities. NOAA's Next Generation Strategic Plan provides an opportunity for the agency to incorporate health concerns into the agency's mission in a meaningful way. The newly-formed Climate Service will also allow NOAA to highlight products useful to individuals who must make decisions on the long-term effects of climate change on health of humans and organisms.

**Recommendation 2: NOAA should develop a comprehensive plan for its health programs**

NOAA needs a plan that ties its health efforts into a comprehensive program and links NOAA's efforts to other federal agencies with complementary skills in environmental and public health. The plan should be based on a systematic risk characterization that identifies and quantifies potential health benefits and threats. This type of prioritization should identify which threats and benefits can best be addressed with short-term operational programs versus those that will

require longer-term research investments. Such planning will ensure that agency investments provide the greatest societal benefit.

### **Recommendation 3: NOAA should focus initially on several priority projects**

The OHWG recognizes that a comprehensive plan for NOAA's health program may take several years to develop, particularly if NOAA conducts a thorough risk prioritization and coordinates its planning with that of complementary agencies. As such, the OHWG identified a number of immediate priority projects that are logical extensions of ongoing NOAA investments that will yield significant societal benefit, including: 1) Forecasts of impending threats; 2) Surveillance systems for emerging pathogens, contaminants, and toxins that affect health; 3) Climate change effects on ocean-related health; and 4) Health benefits from the sea.

The NOAA SAB encourages you and NOAA to take these recommendations seriously and to implement them as soon as possible. It is pointed out that these concerns belong in NOAA's Next Generation strategic planning at the national level as well as at the regional level.

I am certain that the NOAA SAB is prepared to assist NOAA in implementation of these recommendations. If further dialogue or advice is useful, please do not hesitate to contact me.

Sincerely,



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